association with productivity measures. **METHODS:** A cross-sectional survey of adults diagnosed with T2DM on OADs, and not insulin, was conducted. A list of common tolerability issues from OAD prescribing information was provided; experience with each was asked in the survey. The Diabetes Productivity Measure (DPM) and the Work Productivity and Activity Impairment (WPAI) measure work productivity. Chi-square tests were done for categorical variables and t-tests for continuous variables. Linear-regression methods were used to control for respondent characteristics. **RESULTS:** Of 2,074 survey respondents, 53% were men and mean age was 60 yrs (SD = 10.83). In the 2 wks preceding the survey, 70.5% experienced at least one tolerability issue. The most commonly reported issues were hypoglycemia (57.2%, ≥1 symptom), constipation or diarrhea (28%), headaches (26%), and water retention (21%). In most cases, a reduction in work productivity of 8% to 24%, mainly impairing work presenteeism, was observed with tolerability issues reported in the previous two weeks (WPAI: $p < 0.05$). After adjusting for characteristics, significant reductions on productivity, measured by DPM and WPAI ($p < 0.05$), were observed for hypoglycemia (–9.7% to –10.6%), unintended weight loss (–11.1% to –14.4%), water retention (–3.6% to –4.9%), constipation or diarrhea (–2.8% to –4.2%) and urinary tract infection (–13.5% to –16.8%). Cardiovascular events were significant (–67%, $p < 0.05$) with WPAI, but not DPM; nausea/vomiting, headache, genital infections, and appetite loss were not significant. **CONCLUSIONS:** T2DM patients reported a high level of tolerability issues and diabetes symptoms associated with decreased work productivity. This study highlights the importance of addressing tolerability issues and symptoms to reduce overall disease burden.

DIABETES/ENDOCRINE DISORDERS – Health Care Use & Policy Studies

PDB48

GEOGRAPHIC VARIATION IN MEDICATION ADHERENCE

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OBJECTIVES: A considerable amount of the investigation of geographic variation focuses on Medicare data and excludes prescription drugs. This study focuses on prescription medications used to treat chronic conditions in the commercial sector and incorporates demand-side information on insurance benefit design (e.g., patient cost-sharing) to analyze variations in adherence. **METHODS:** Patients age 18–64 in employer-sponsored plans with at least two years of continuous medical and prescription coverage meeting diagnostic criteria for diabetes were found in the MarketScan Database (n = 449,127). Medication Possession Ratios (MPRs) were calculated in 2006 and 2007 for four classes of medications (antidiabetic medications, statins, ACE Inhibitors, Angiotensin II Receptor Blockers (ARB)) for each patient with at least one prescription within the class each year. Multivariate logistic regressions of poor adherence (MPR < 80%) were estimated to adjust for patient, employer, benefit plan, provider supply, and area (e.g., income, unemployment) characteristics. Expected adherence based on predicted values from the multivariate regressions was aggregated to the geographic area (hospital referral region, HRR) level and the ratio of observed to expected adherence was computed along with the 95% confidence interval of the ratio. **RESULTS:** Across HRRs the median rate of subobtimal antidiabetic medication adherence was 32.3% of patients, rates in HRRs varied from 19.2% to 54.6%. The median rate was 44% for ACE Inhibitors (range 30.2% to 60.4%), 43.9% for ARBs (range 27.5% to 60.7%) and 59.3% for statins (range 45% to 74.5%). The difference between observed and expected adherence was statistically significant for 8.9% of HRRs for antidiabetic medication, 9.1% of HRRs for ACE Inhibitors, 6.7% of HRRs for ARBs and 1.3% of HRRs for statins ($p < 0.05$). **CONCLUSIONS:** Observed market level traits such as provider supply and unemployment explain some of the variation in adherence. After adjusting for covariates, geographic variation in chronic condition medication utilization remains.

PDB49

THE EFFECT OF READINESS TO CHANGE ON MEASURES OF DIABETES CONTROL AND ATTITUDES TOWARDS DIABETES

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OBJECTIVES: A randomized controlled study is being conducted to evaluate 2 types of educational interventions (groups using Conversation Maps, versus individual) compared to usual care (no educational intervention) for patients with pre-existing type-2 diabetes and suboptimal glycemic control (A1c >= 7%). The purpose is to determine if there are correlations at baseline with patient Readiness to Change (RTC) and attitudes toward diabetes, and measures of general health and diabetes control. **METHODS:** At baseline, 167 female and 172 male patients (mean age 63 years, mean A1c 8.1) enrolled in the Merck-funded Journey for Control of Diabetes IDEA Study and completed a baseline survey. Validated instruments embedded in the survey were: RTC (O'Connor et al, 2004), functional health status (SF-12), attitude towards diabetes (positive attitude and care ability scales, sections of the Diabetes Care Profile from Michigan Diabetes Research and Training Center). Also, the most recent A1c result within the last six months and length of time diagnosed with diabetes were obtained. **RESULTS:** Pearson correlations were used to assess associations between RTC and general health, diabetes attitudes, and measures of diabetes control. Mean RTC scores were 24.02 (range 7 – 38; n = 320), with females slightly more ready to change than males ($p = 0.0924$). RTC had a significant positive correlation with A1c ($r = 0.1096$, $p = 0.0500$), with both the number of reported hypoglycemic events ($r = 0.16217$, $p = 0.0037$) and hyperglycemic events ($r = 0.13854$, $p = 0.0133$). RTC was also significantly correlated with Positive Attitudes toward diabetes ($r = 0.11415$, $p = 0.0433$). Interestingly, RTC was not related to functional health ($r = 0.10964$, $p = 0.7167$). **CONCLUSIONS:** RTC is a useful tool to identify the potential success for diabetes education. Additional validation of this finding will be available upon the conclusion of the study.

PDB50

STATUS OF DIABETES CONTROL AMONG COMMUNITY PHARMACY USERS WITH DIABETES: AN ANALYSIS OF THE MEDICAL EXPENDITURE PANEL SURVEY

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OBJECTIVES: To determine diabetes control status among community pharmacy users with diabetes. **METHODS:** This is a cross-sectional observational study analyzing the Medical Expenditure Panel Survey (2005), a survey nationally representative of non-institutionalized civilians. The study population was community pharmacy users older than 17 with diabetes. Using a chi-square test, this study compared the proportions of the study population with complications and without complications meeting the diabetes control standards of the American Diabetes Association (ADA). A logistic regression was employed to compare between the 2 groups the likelihood of incurring drug costs over $4000 in 2006 dollars, the cost criterion for being eligible for mediation therapy management (MTM) services. Community pharmacies were defined as pharmacies other than mail-order and online pharmacies. **RESULTS:** In 2005, 95.27% of patients with diabetes filled prescriptions through community pharmacies. There were gaps between their diabetic control and the ADA standards, especially in the use of preventive services: e.g., ADA recommends weight control, but the proportions of overweight or obese were 84.09% and 89.42% among patients without complications and those with complications, respectively ($P = 0.312$ for the group comparison). Patients with complications have higher likelihood of meeting the cost criterion for MTM services even after adjusting for confounding factors ($P = 0.005$). **CONCLUSIONS:** The room for improvements in diabetes control among community pharmacy users in this study present pharmacists with opportunities for improving diabetes management.

PDB51

ASSOCIATION BETWEEN MEDICATION ADHERENCE AND HBA1C LEVELS IN DIABETIC PARTICIPANTS ENROLLED IN A DISEASE MANAGEMENT PROGRAM

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OBJECTIVES: To describe the relationship between A1c levels and medication possession ratio (MPR) of three oral anti-hyperglycemic medications (sulfonylureas, biguanides and thiazolidinediones) for participants enrolled in a diabetes disease management program. **METHODS:** This was a retrospective evaluation of participants enrolled in a diabetes disease management program. Continuously enrolled participants were included if there was a documented A1c value. The MPR was calculated from administrative pharmacy claims data. Participants were classified as low, moderate or high risk based on their A1c levels. ANOVA was used to analyze differences in mean MPR between the three groups. For participants on more than one drug class, a Pearson's correlation was used to analyze relationship of MPRs between different drug classes. **RESULTS:** A total of 57 percent of participants on sulfonylurea therapy, 64 percent of participants on biguanides and 63 percent of those on thiazolidinediones reached an A1c goal of <7. Participants classified as high risk (A1c > 9) had a lower MPR compared to participants in the low and moderate risk group ($p < 0.0001$). For participants taking a sulfonylurea, the mean MPR for those who reached the predetermined A1c goal (<7) was 0.89 (±0.21) compared with 0.76 (±0.30) for those in the high risk group ($p < 0.001$). MPR for thiazolidinediones was 15 percent lower in participants with A1c > 9 ($p < 0.001$). Pearson correlation analysis showed a positive relationship between the MPRs in different drug classes. **CONCLUSIONS:** Medication adherence as measured by the MPR was higher for participants who reached the target A1c goal of <7.

PDB52

THE UTILITY OF A PRIOR-AUTHORIZATION REQUIREMENT FOR IMPLEMENTING RECOMMENDATIONS FOR HBA1C TESTING IN A MANAGED CARES SETTING IN ISRAEL

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OBJECTIVES: Tight glycemic control of diabetic patients yields both clinical and financial benefits. Despite recommendations for HbA1C testing to assess the effectiveness of management plans on glycemic control, achieving adherence to recommendations for frequency of HbA1C testing continues to be a challenge. When prior authorization (PA) was required in the Leumit Health Fund of Israel for expensive diabetes medications, requests for these drugs were not reviewed until the patient had performed an HbA1C test (one test within the previous four months). This policy induced complete adherence to recommendations for testing amongst patients treated

with target drugs. The purpose of this study was to ascertain whether revocation of the PA requirement resulted in inferior rates of HbA1C testing amongst new users of these drugs. **METHODS:** Data on of new users of the target drugs and on HbA1C testing in these patients was extracted from EPR databases for the six-month post-revocation period. The proportion of patients who performed at least one HbA1C test during the four months prior to initiation of treatment and 95% confidence intervals were calculated. The data were stratified by month to detect possible trends in rates of testing during the post policy-change period. **RESULTS:** After rescinding the PA requirement, HbA1C testing amongst incident users of the target drugs dropped from 100% during the PA period to rates of 85.6% (95% CI = 79.7, 91.5) to 94.4% (95% CI = 90.8, 97.9). Statistically significant variance in monthly rates of testing was not observed. **CONCLUSIONS:** The PA requirement resulted in total performance of a lab test necessary to monitor drug-therapy outcomes in diabetic patients. When PA is implemented as a quality-assurance strategy, revocation should be accompanied by continuing-education efforts to maintain adherence to recommendations for appropriate care.

PDB53

SHORT-TERM OUTCOMES FOR AN EMPLOYER SPONSERED PHARMACIST- PROVIDED MULTI CENTER DIABETES MANAGEMENT PROGRAM

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OBJECTIVES: To measure the impact of pharmacist-provided diabetes management program on the economic, clinical, and humanistic outcomes for the City of Toledo employees and their dependents for a period of 6 months. **METHODS:** This is a prospective, pre-post longitudinal study. Clinical outcomes collected were A1c, blood pressure (BP), and body mass index (BMI). These outcomes were measured at the baseline, 3 and 6 month visits. Economic outcomes include cost of physician office visits, emergency room visits, and inpatients days. These outcomes were measured at baseline and 6 month visits. Humanistic outcomes collected were quality of life (using Sf36v2), patient satisfaction, adherence with medications, and knowledge about diabetes. The quality of life and knowledge about diabetes were measured at baseline and 6 month visits. The patient satisfaction and adherence with medications (using Morisky scale) were measured at baseline and 3 months visits. Wilcoxon-Signed rank test was used to compare variables at two time points. Friedman test was used to compare variables at multiple time points. Preliminary data analysis for the period between baseline visit to 3 months visit is given below. **RESULTS:** Ninty five patients have been enrolled to date. Mean A1c's have decreased significantly from 7.78 at baseline visit to 7.44 at 3 months ($p = 0.05$) ($N = 59$). For Intention to treat population (baseline A1C > 7), the decrease in A1c is even more significant ($p = 0.01$) ($N = 33$). Diastolic blood pressure has decreased significantly ($p = .001$) while systolic blood pressure and BMI have decreased non-significantly. Self monitoring of blood glucose has increased significantly ($p = 0.01$). Patient satisfaction and adherence with medications has also improved significantly at three-month follow-up visit ($p < 0.05$). Final results for the period between baseline visit to 6 months including economic outcomes will be presented at the ISPOR 14th Annual International Meeting. **CONCLUSIONS:** Preliminary data analysis showed that pharmacists can improve the clinical outcomes in patients with diabetes.

PDB54

DULOXETINE THERAPY AND CHANGES IN OPIOID USE AMONG DIABETIC PERIPHERAL NEUROPATHIC PAIN PATIENTS

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OBJECTIVES: This study examined changes in opioid medication utilization following treatment for diabetic peripheral neuropathic pain (DPNP). **METHODS:** We studied commercially insured individuals aged 18–64 years who were dispensed duloxetine or other DPNP standard of care (SOC) medications (i.e. escitalopram, venlafaxine, gabapentin, amitriptyline, or pregabalin) between March 1, 2005 and December 31, 2005. The dispense date of the initial agent was denoted as the "index date." Patients included were diagnosed with DPNP in the 1 year prior to index and received opioids in the prior 90 days. "Duloxetine" and "SOC" cohorts were constructed based on index agent. Patients in the duloxetine cohort were required to be "continuous" users (medication possession ratio ≥0.8). We assessed changes in long-acting (LA) and short-acting (SA) opioid utilization one year before and after the index date. Multivariate linear regressions were performed to control for differences in patient demographic and clinical characteristics between study cohorts. **RESULTS:** We identified 97 duloxetine patients and 943 SOC patients. Study cohorts were similar in age (mean = 55 years) and proportion female (53%). Over 87% and 20% patients in each cohort were dispensed an SA and LA opioid in both the pre- and post-index periods, respectively. Hydrocodone was the most common SA opioid, followed by propoxyphene. Oxycodone and tramadol were the most common LA opioids. Compared to SOC patients, continuous duloxetine patients had a greater reduction in days on SA hydrocodone (25.8 days, $p < 0.05$), number of SA hydrocodone prescriptions (1.4, $p < 0.05$), and days on DPNP-related SA opioids (15.5, $p = 0.09$). Continuous duloxetine users also had greater reduction in days on LA oxycodone compared with the SOC patients (8.9, $p < 0.05$). **CONCLUSIONS:** These findings among DPNP patients indicate that continuous duloxetine users were more likely to have a reduction in use of SA opioids and LA oxycodone versus SOC patients.

PDB55

UTILIZATION OF ANTIDIABETIC MEDICATIONS OF PATIENTS WITH TYPE 2 DIABETES COVERED BY VARIOUS TYPES OF HEALTH INSURANCE IN A US NATIONAL REPRESENTATIVE POPULATION IN YEAR 2005–2006

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OBJECTIVES: The impact of various medical insurance structures on the quality of care is not clearly understood. Drug utilizations patterns of type 2 diabetes patients may be affected by health care access, which vary across various types of health insurance and may lead to disparities in disease control and clinical results. **METHODS:** A cross-sectional analysis was conducted on data from the National Health and Nutrition Examination Survey (NHANES) 2005–2006. Based on data from survey, patients aged 20 years and older with diagnosed type 2 diabetes were classified as patients with commercial insurance, Medicare and/or Medigap, Medicaid, multiple insurance, other types of insurance and no health insurance coverage. Likelihood of oral anti-diabetic medications, insulin or combinations and the likelihood of having successful Glycemic control were modeled with multi-variables logistic regression analyses with adjustment for age, gender, BMI, ethnicity, diabetic complications, household incomes and important co-morbidities. **RESULTS:** A total of 403 diabetic patients were included in the analysis. Compared to commercially-insured patients, patients under Medicare (OR = 1.36, 95% CI = 0.62, 3.00) or Medicaid (OR = 2.32, 95% CI = 0.76, 7.04) were more likely to be treated with insulin, but less likely to receive oral anti-diabetic medications (OR = 0.19, 95% CI = 0.09, 0.40 for Medicare; OR = 0.19, 95% CI = 0.07, 0.51 for Medicaid). The likelihood of having successful glucose control varied but was not significantly different across types of plans ($P > 0.05$). **CONCLUSIONS:** Treatment patterns varied across various types of health insurance plans and might have impact on the optimum quality of care and expenditure implications.

PDB56

THE EFFECT OF VALUE-BASED INSURANCE DESIGN ON ADHERENCE TO DIABETES MEDICATIONS: A MATCHED DIFFERENCE IN DIFFERENCE EVALUATION

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OBJECTIVES: To evaluate the impact of value-based insurance design (VBID) on adherence to diabetic medications. **METHODS:** Health Alliance Medical Plans of Illinois piloted VBID by placing at least one diabetic drug in each class at Tier 1 with a $10 copayment for a subgroup of 5400 enrollees in January 2007, while keeping drug benefits unchanged for all other plan enrollees. A matched difference in difference method (DID) was used to evaluate the effect of VBID, based on pharmacy claim data. Patients with unchanged benefits in the same plan were used as the control group. Patients included in the analysis needed to be continuously enrolled from January 2006 to December 2007 and have used diabetic medications in both years. Adherence was measured by the proportion of days covered (PDC). A logistic model was used to model the probability of having PDC >= 0.8. A 1-to-1 matched control group was generated based on propensity score. **RESULTS:** There were 71 patients in the case group and 5037 patients in the control group. The matched control group had 71 patients with similar propensity score, baseline characteristics and baseline adherence level with the case group. After the implementation of VBID, the average copayment for diabetic medications decreased from $21.70 to $14.00 for the case group and increased from $19.60 to $22.00 for the matched control group. The probability of being adherent increased from 69% to 79% for the case group and decreased from 72% to 70% for the matched control group. The matched DID model showed that VBID increased the probability of being adherent: OR = 1.84, 95% CI: 0.96–3.54, $p = 0.068$. The full sample DID estimated OR = 1.56 with $p = 0.065$. **CONCLUSIONS:** A VBID program that reduced the copayment for diabetic medications by 35% improved the odds of adherence by 84% and reduced the number of non-adherent patients by 35%.

PDB57

MEDICATION NONADHERENCE AND POTENTIALLY AVOIDABLE HOSPITALIZATIONS AMONG PATIENTS WITH DIABETES

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OBJECTIVES: To examine the association between medication adherence and potentially avoidable hospitalizations (PAHs) among Medicare part D enrollees with diabetes. **METHODS:** A longitudinal retrospective cohort study of 493,609 Medicare part D enrollees with diabetes from 6 states (Alabama, California, Florida, Mississippi, New York and Ohio) who had filled at least 1 prescription for oral hypoglycemics, angiotensin-converting enzyme inhibitors/angiotensin II receptor blockers, and statins. Adherence was calculated as proportion of days covered for all three classes of medications using Part D records for the first 6 months of 2006. A summary measure of adherence was computed for each patient as an ordinal variable – adherent to none, any one class, any two classes and all three classes of medications. Medicare part A records for the next nine months were used to identify PAHs, as defined by the AHRQ's Prevention Quality Indicators for diabetes care. Logistic regression was used to assess the association between nonadherence and PAHs. **RESULTS:** A total of 16.2%, 15.7%, 27.3% and 40.8% of patients were adherent with none, any one class, any 2 classes and all three classes of medications respectively. A total of 23,222 (4.7%) patients had at least one PAH, 0.12% had an admission due to diabetes short-term